

generating repulsive magnetic field. In addition, the first magnetic ring 51 and the second magnetic ring 52 are disposed in axial alignment to have opposite polar disposition for generating an axially repulsive magnetic field. The radially repulsive magnetic field, generated between the second magnetic ring 52 and the third magnetic ring 53, and the axially repulsive magnetic field, generated between the first magnetic ring 51 and the second magnetic ring 52, allow to reduce friction between the sleeve bearing 5 and the shaft 21 upon rotation of the shaft. The same situation may be deduced by analogy that the three magnetic rings 511, 521 and 531 in the lower magnetic portion facilitate reducing friction between the sleeve bearing 5 and the shaft 21 upon rotation.

Fig. 4 is a schematic diagram of the magnetic bearing assembly according to the second embodiment of the present invention. The magnetic bearing assembly includes a magnetic portion and a bearing portion. The bearing portion is a sleeve bearing 5. The magnetic portion comprises an upper magnetic portion having two magnetic rings, i.e. an inner magnetic ring 73 and an outer magnetic ring 74, and a lower magnetic portion having three magnetic rings, i.e. 75, 76 and 77. In the upper magnetic portion, the inner magnetic ring 73 is connected to the shaft 21 and the outer magnetic ring 74 is connected to the stator 23. These two magnetic rings 73 and 74 are disposed in radial alignment with each other to have like polar disposition for generating repulsive magnetic field. In the lower magnetic portion, the first magnetic ring 75 and the third magnetic ring 77 are connected to the shaft 21 and the second magnetic ring is connected to a base 24 associated with the stator 23. These three magnetic rings 75, 76 and 77 are disposed in axial alignment to have opposite polar disposition for generating axially repulsive magnetic fields. Therefore, the friction between the sleeve bearing 5 and the shaft 21 upon rotation is considerably reduced.